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erate even 40 times. The successive regeneration of heads may be checked by the regeneration of the tail. Regenerated parts when detached from the worm are not capable of new regeneration.

The most novel part of the paper is that which describes various cases of heteromorphosis, and other malformations in the regenerating tail, including the regeneration of double tails in *Lumbrieulus* or of triple tails in *Tubifex*.

SERGIUS MORGULIS.

September 7, 1908.

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#### THE BUDGETT MEMORIAL VOLUME

**John Samuel Budgett**, naturalist, explorer, scholar and artist, was born in Bristol, England, in 1872. He received his education at University College in Bristol, and later at the University of Cambridge, where he received the appointment as Balfour Student in Natural Sciences, "the zoological blue ribbon of Cambridge." Here he gave, in 1902, a course of lectures on the "Geographical Distribution of Animals," succeeding in this work the eminent ornithologist, Professor Alfred Newton. His work at Cambridge was interrupted and enriched by zoological exploring expeditions to South America and to Africa, efforts which from the natural history side were successful in the highest degree, but which ultimately cost him his life.

The first of these, in 1896, was to the Swamps of La Plata River at Gran Chaco in Paraguay, in search of the singular mud-fish, *Lepidosiren paradoxa*. The life history and embryology of this fish was expected to throw much light on the nature of the order of Dipnoans to which it belongs. All stages of the life history of *Lepidosiren* were represented in the collection made by Mr. Budgett, and the expedition was brilliantly successful.

On the next expedition, in 1899, he visited the Gambia River, where another genus, *Protopterus*, of the same group of mud-fishes is found.

In the third expedition, in 1900, he visited the Gambia again, gathering material for not only the life history of the dipnoan, *Protopterus*, but of different species of the equally interesting

<sup>1</sup> The work of John Samuel Budgett, Balfour Student at the University of Cambridge, edited by J. Graham Kerr, University Press, Cambridge, G. P. Putnam Sons, New York, p. 422 quarto, with many engravings in stone. Price \$7.00.

crossopterygian, *Polypterus* as well. With this was obtained material for the study of *Gymnarchus* and other peculiar fishes of the African streams.

In 1902, Mr. Budgett undertook an expedition to Nyanza and the head streams of the Nile.

A final trip was made in 1903, to the Niger River, in which, as in the others, he found species of *Polypterus*, and with which he made most interesting experiments in artificial fertilization.

In all of these expeditions, Mr. Budgett found what he sought, and their importance to science can hardly be too highly estimated. The embryology, taxonomy and geographical distribution of these fishes, as well as of different genera of frogs, received notable accessions. But Mr. Budgett's health was sacrificed in the work. A recurrent attack of "blackwater fever," one of the many diseases known as malaria, caused his death on January 19, 1903, at the age of thirty-one.

The publications of Mr. Budgett give the record of these expeditions, and also discussions of the anatomy, the embryology and the breeding habits of *Polypterus*, *Protopterus* and other species. The batrachians of the Paraguayan Chaco are described in detail, and there is a paper on the birds of the Gambia River.

All these papers of Budgett, with others by Dr. G. A. Boulenger, Dr. J. Graham Kerr, J. Herbert Budgett, Richard Assheton, Edward J. Bles and Edward T. Browne, based on material collected by Mr. Budgett, have been sumptuously printed in the present memorial volume by Mr. Budgett's friends and fellow-workers at Cambridge. A delicately appreciative biographical sketch of Mr. Budgett is contributed by Dr. Arthur E. Shipley. In this are extracts from Mr. Budgett's diaries, showing his fine appreciation of nature and his charming and forceful use of English. The plates illustrating this volume are worthy of the text, and the whole is a noble memorial to an able naturalist, a brave and lovable man, who fell untimely from the hazards of his chosen calling.

DAVID STARR JORDAN.